



# National Transportation Safety Board

## Marine Accident Brief

### Collision between Tanker *Chembulk Houston* and Container Ship *Monte Alegre*

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<b>Accident no.</b>	DCA15FM016
<b>Vessel names</b>	<i>Chembulk Houston</i> and <i>Monte Alegre</i>
<b>Accident type</b>	Collision
<b>Location</b>	Houston Ship Channel, Galveston Bay, Houston, Texas 29°26.2' N, 94°50.2' W
<b>Date</b>	March 5, 2015
<b>Time</b>	1334 central standard time (coordinated universal time – 6 hours)
<b>Injuries</b>	None
<b>Property damage</b>	<i>Chembulk Houston</i> : \$729,600; <i>Monte Alegre</i> : \$997,700
<b>Environmental damage</b>	None
<b>Weather</b>	Visibility at 6 to 10 miles, north winds at 17 to 20 knots with gusts to 25 knots, low tide 0.03 feet, ebbing current estimated at less than 1 knot, air temperature 42°F
<b>Waterway information</b>	The 55-mile-long Houston Ship Channel connects the Gulf of Mexico with several terminals at the Ports of Texas City, Galveston, and Houston. The ship channel in the area of the collision is about 530 feet wide and 45 feet deep.

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On March 5, 2015, at 1334, tanker *Chembulk Houston* and container ship *Monte Alegre* collided and grounded in the Houston Ship Channel, after the pilots agreed to let the *Chembulk Houston* overtake the *Monte Alegre*. Both ships were inbound in the channel. No injuries or pollution resulted from the accident, but both vessels sustained damage above their waterlines, totaling more than \$1.7 million.



**Tanker *Chembulk Houston*. (Photo by Peter Langsdale, at photo-forums.net)**

\* Unless otherwise noted, all miles in this report are nautical miles, and all vessel speeds (in knots) are speed over ground (actual speed of the vessel relative to the surface of the Earth, taking into account currents, etc.).

## Collision between Tanker *Chembulk Houston* and Container Ship *Monte Alegre*

Tanker *Chembulk Houston*, with 17,702 cubic meters of cargo capacity, was one of more than 40 oceangoing tankers in the fleet of BLT Chembulk Group. One month before the accident, on February 5, 2015, the *Chembulk Houston* departed the Caribbean island of St. Eustatius with naphtha solvents and lube oil as cargo, headed for the Stolthaven Terminal in Houston, Texas.

The *Chembulk Houston* bridge team at the time of the accident consisted of a master, a second officer, a helmsman, and a deputy pilot from the Houston Pilots Association. The master had more than 14 years of experience at sea and had held an unlimited credential as master of any waters for about 1 year. He told investigators that he had transited in and out of the Houston area several times as either master or chief officer on vessels similar in size to the *Chembulk Houston*. He joined the *Chembulk Houston* 2 months before the accident.

Container ship *Monte Alegre*, with a capacity of about 5,560 twenty-foot equivalent units (TEU; standard shipping containers), was one of about 100 container ships owned or chartered by Hamburg Süd, a large Germany-based shipping company founded in 1871. On February 28, 2015, the *Monte Alegre* departed Altamira, Mexico, headed for the Port of Houston's Barbours Cut Container Terminal ("Barbours Cut Terminal") in La Porte, Texas.



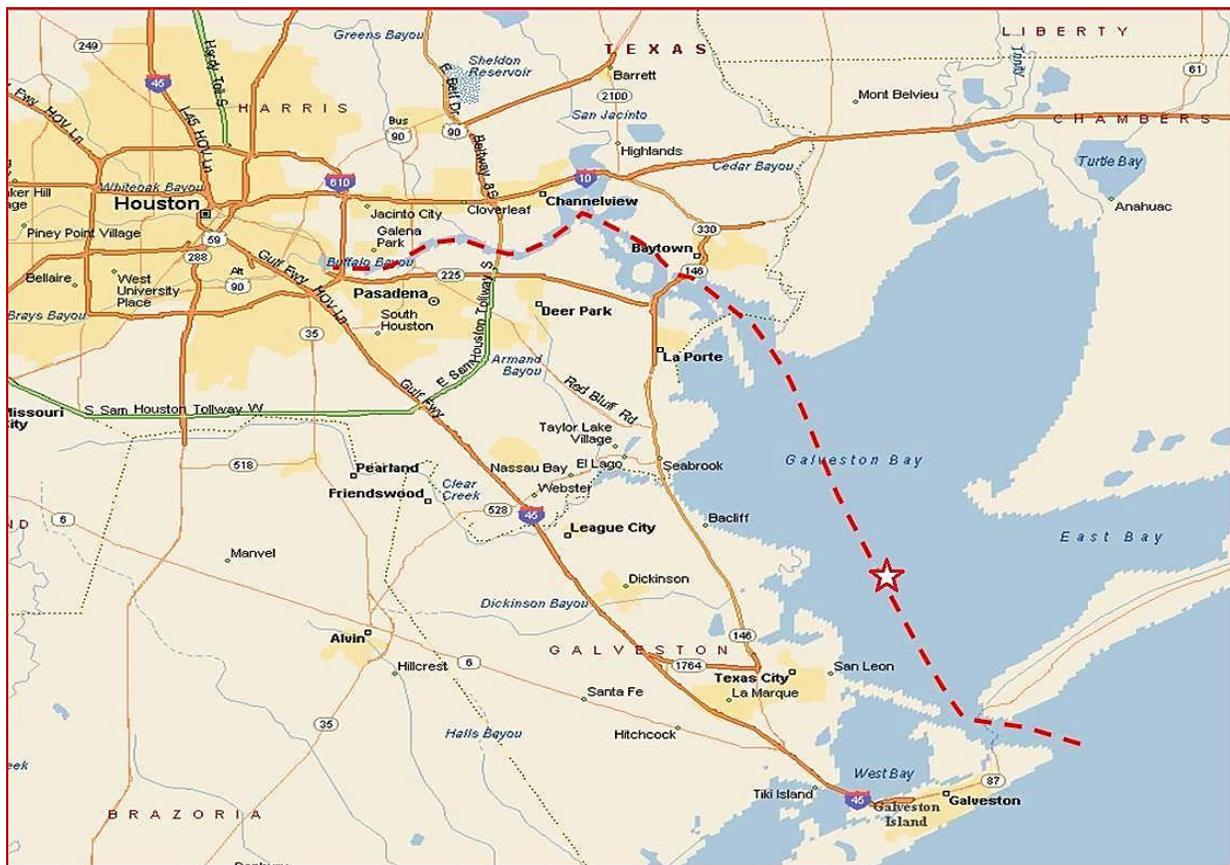
Container ship *Monte Alegre*. (Photo by Ria Maat, at panoramio.com)

The *Monte Alegre* bridge team at the time of the accident consisted of a master, a second officer, a helmsman, and a pilot from the Houston Pilots Association. The master, who held an unlimited credential as master on any waters, had 25 years of experience at sea, including about 12 years as master. He told investigators that he had transited in and out of the Houston area several times since 2000. He joined the *Monte Alegre* as master in early February 2015.

At 0900 on the morning of the accident, the *Chembulk Houston*, which was anchored in the southern fairway anchorage off Galveston, Texas, heaved anchor while awaiting arrival of a pilot for the inbound transit to the Stolthaven Terminal. At 1126, the master provided the vessel's sailing plan to vessel traffic service (VTS) Houston/Galveston. A deputy pilot (an apprentice in his second of 2 years of training to become a full pilot with the Houston Pilots Association) boarded the vessel about 1150.

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The *Monte Alegre* was anchored in the northern fairway anchorage off Galveston that morning, awaiting arrival of a Houston pilot for its inbound transit to La Porte. About 1204, shortly after the pilot boarded the container ship and the vessel got under way, he provided his initial position report to VTS and stated that the container ship's draft was 10.9 meters (about 36 feet). The deputy pilot on the *Chembulk Houston* also provided an initial position report about 1205 and stated that the tanker's draft was 6.9 meters (about 23 feet). At that time, both vessels were slowly making way in a generally northern direction in the Galveston Bay Entrance Channel. In the vicinity of lighted buoys nos. 5 and 6, the pilot on the *Monte Alegre* learned that the tugboats he intended to use for maneuvering and docking at Barbour's Cut Terminal would be delayed for about 1 hour to 1 hour and a half. He therefore decided to reduce the speed of the container ship. At that time, the *Monte Alegre* was transiting at a speed of about 9.7 knots and was positioned more than 2 miles ahead of the *Chembulk Houston*, which was transiting at a speed of 8.8 knots.



Map of the accident area. The Houston Ship Channel is marked by a red-dashed line. The collision site is overlaid by a red star. (Background by Microsoft Maps)

The deputy pilot on the *Chembulk Houston* learned via very high frequency (VHF) radio about the delayed tugboats and the intention of the pilot on the *Monte Alegre* to slow his vessel. Audio captured from both vessels' voyage data recorders (VDR) indicated that about 1249, the deputy pilot contacted the pilot via VHF radio channel 13 and suggested that the *Chembulk Houston* overtake the *Monte Alegre*. The pilot on the *Monte Alegre* agreed. The deputy pilot on the *Chembulk Houston* then asked the pilot on the *Monte Alegre* which side was best for overtaking, to which the pilot responded that his preference was his vessel's port side. The deputy pilot then informed the *Chembulk Houston* master of his intention to overtake the *Monte Alegre*, to which the master replied, "Okay." At 1254, the deputy pilot on the *Chembulk Houston*

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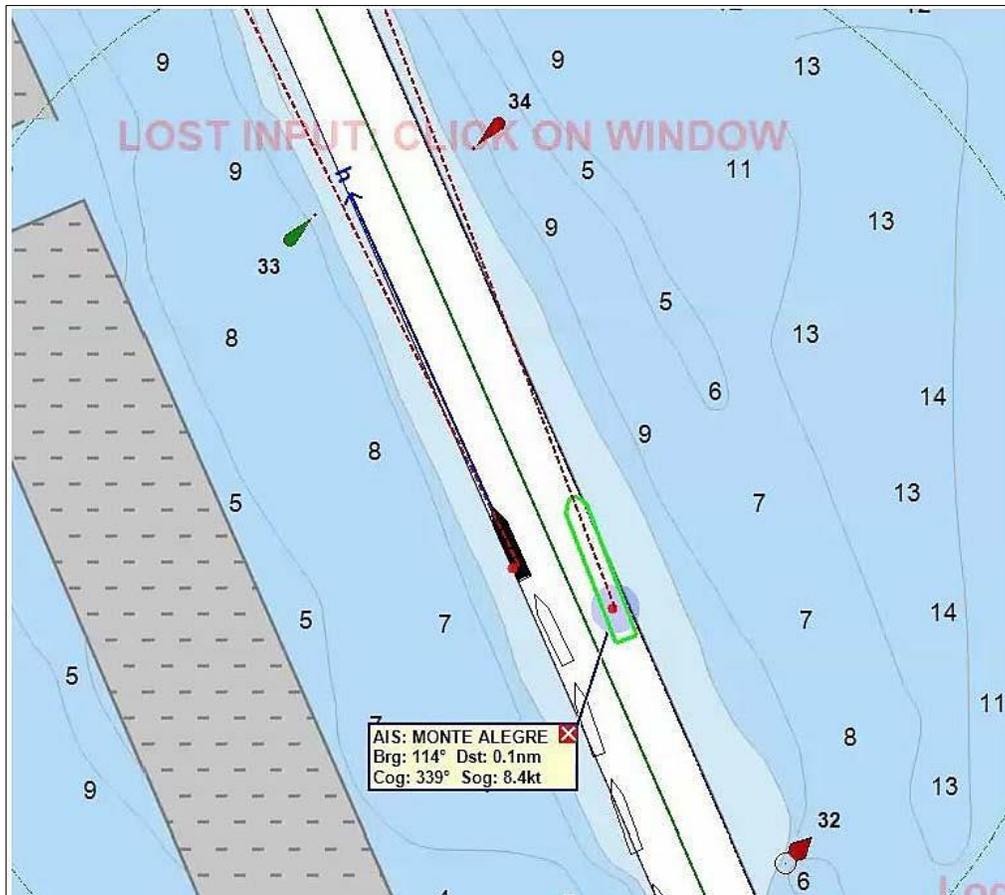
reaffirmed his intention to overtake the *Monte Alegre* by calling the pilot on the *Monte Alegre* via cellphone.

By 1307, both vessels had successfully cleared the intersection with the Gulf Intracoastal Waterway, and the *Monte Alegre* was positioned about one-half mile ahead of the *Chembulk Houston* and transiting at a speed of about 6.5 knots. The *Chembulk Houston* was transiting at a speed of 10.5 knots. At 1310, the deputy pilot on the *Chembulk Houston* radioed the pilot on the *Monte Alegre* on VHF channel 13, stating, “[pilot’s first name] here I come” to indicate that he was initiating the overtaking. The pilot on the *Monte Alegre* replied, “Okay.” At that moment, the *Chembulk Houston* was transiting at 10.1 knots with an underkeel clearance of about 23 to 26 feet (7 to 8 meters). The pilot on the *Monte Alegre* had the engine throttle control at slow-ahead speed and was transiting at 6.7 knots, with an underkeel clearance of about 16 feet (5 meters). During his interview with investigators, the deputy pilot on the *Chembulk Houston* indicated that he wanted the speed differential between the vessels to be about 3 knots during the overtaking.

At 1316, as the *Chembulk Houston*’s bow began overtaking the *Monte Alegre*’s stern, the pilot on the *Monte Alegre* ordered a speed increase from slow ahead to half ahead. During the next 2 minutes, the speed of the *Monte Alegre* increased from between 6.7 and 7.1 knots to between 8.3 and 8.7 knots. At 1318, the deputy pilot on the *Chembulk Houston* radioed the pilot on the *Monte Alegre* and stated, “[pilot’s first name] I’m losing speed all the time.” The pilot on the *Monte Alegre* then ordered the speed reduced from half ahead to slow ahead, and replied, “I am only making 8 knots.” The deputy pilot on the *Chembulk Houston* replied that he would continue his attempt to overtake the *Monte Alegre* but said that he might have to abort the maneuver and drop back behind the container ship. At 1319, the pilot on the *Monte Alegre* ordered the speed reduced further, from slow ahead to dead slow ahead.

About 1320, the deputy pilot on the *Chembulk Houston* contacted the pilot on the *Monte Alegre* and said, “I’m losing even more [referring to his vessel’s speed]. Do you want me to drop back?” The pilot on the *Monte Alegre* replied, “Yeah, probably the best thing.” The deputy pilot stated that he would begin easing off the throttle so that he could drop back into a position behind the *Monte Alegre*. The pilot on the *Monte Alegre* replied that he would increase the container ship’s speed to assist in repositioning the vessels. According to the two pilots’ portable pilot units (PPUs), at 1320, the speed of the *Monte Alegre* was about 8.4 knots and the speed of the *Chembulk Houston* was 8.3 knots. During the next 2 minutes, the pilot on the *Monte Alegre* issued a series of commands intended to increase the speed, bringing the engine throttle from dead slow ahead to full ahead. On board the *Chembulk Houston*, from about 1320 to 1326, the deputy pilot issued a series of commands intended to slow the vessel, bringing the engine throttle from full ahead to slow ahead. Nevertheless, the *Chembulk Houston*’s speed actually increased. At 1326, according to the PPU, the speed of the *Chembulk Houston* had increased to 11.2 knots. The speed of the *Monte Alegre* was 10 knots.

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Still image extracted from the PPU used on board the *Chembulk Houston*, showing the approximate position of the two vessels at 1320 when the overtaking situation was aborted. (Image provided by the Houston Pilots Association)

At 1326, the deputy pilot on the *Chembulk Houston* ordered the rudder hard to port (about 35 degrees to port), then midship, then port 10 degrees, and then port 20 degrees. At 1327, he ordered the speed increased from slow ahead to half ahead. The *Chembulk Houston* crew carried out these orders. He then radioed the pilot on the *Monte Alegre* and asked him to increase the speed of the *Monte Alegre* because he was “having a hard time here.” The pilot on the *Monte Alegre* asked, “What’s the problem?” to which the deputy pilot replied, “I’m having a hard time slowing down.” The pilot on the *Monte Alegre* then said, “You might have to drive it out of the channel there, uh, I don’t know.” At 1328, the deputy pilot on the *Chembulk Houston* asked the master, “We at slow now?” The master replied, “We’re at half ahead, sir.” Half ahead was the most recent throttle command that the deputy pilot had issued, at 1327. The deputy pilot responded, “No, slow ahead.” The crew acknowledged this command, and the slow-ahead speed was again achieved by 1329.

During the next 4 minutes, the deputy pilot on the *Chembulk Houston* issued several helm and throttle commands, ranging from hard port to hard starboard and from dead slow ahead to full ahead, that were intended to prevent the tanker from making contact with the *Monte Alegre*. Despite these efforts, at 1334, the starboard-side bow and anchor of the *Chembulk Houston* collided with the *Monte Alegre*’s aft portside hull, and the ships remained in contact as the tanker progressed forward. At the time of the collision, the speed of the *Chembulk Houston* was 9.2 knots and the speed of the *Monte Alegre* was 9.6 knots. Both vessels veered to port and grounded on the soft bottom of the Houston Ship Channel near light no. 39.

## Collision between Tanker *Chembulk Houston* and Container Ship *Monte Alegre*



Still image extracted from video on board the *Monte Alegre*, showing the *Chembulk Houston*'s starboard-side bow and anchor in contact with the *Monte Alegre*'s port side. The initial contact occurred farther aft on the *Monte Alegre*.

The VTS controller responsible for monitoring each vessel's movement in this section of the Houston Ship Channel did not see the accident develop on the VTS computer screens nor did he recall hearing any of the preaccident pilot communications on VHF channel 13. The VTS controller learned of the accident at 1346, after the VTS director telephoned the VTS watch supervisor (the senior member of the VTS watch team). At 1353, because of the collision and subsequent grounding of both vessels, the VTS watch supervisor, per the direction and authority of the captain of the port, closed a 4-mile section of the Houston Ship Channel (between light nos. 26 and 42).

The crew on each vessel assessed the damage and sounded the tanks, voids, and cargo space to check for loss of cargo and/or flooding. In each case, the crew determined that the vessel could be safely refloated. About 1430, the *Monte Alegre* crew managed to refloat the container ship without outside assistance and proceeded to a berth at Barbours Cut Terminal. Shortly thereafter, about 1440, the *Chembulk Houston* crew was able to refloat the tanker with the assistance of the crew on board towing vessel *Lamar*, and the tanker also proceeded to a berth at Barbours Cut Terminal. At 1447, VTS reopened the Houston Ship Channel to all traffic.

Damage to the *Chembulk Houston* totaled \$729,600 and extended about 216 feet between frames 106 and 182 on the starboard side. The damage included distorted internal structural framing, bent railings, and inset and punctured main deck and hull.

Damage to the *Monte Alegre* totaled about \$997,700 and included distorted internal structural framing and hull inset along a distance of about 660 feet on the port side between frames 40 and 110, about 53 to 65 feet above the waterline. The hull was punctured in several places along this 660-foot-long damage section.

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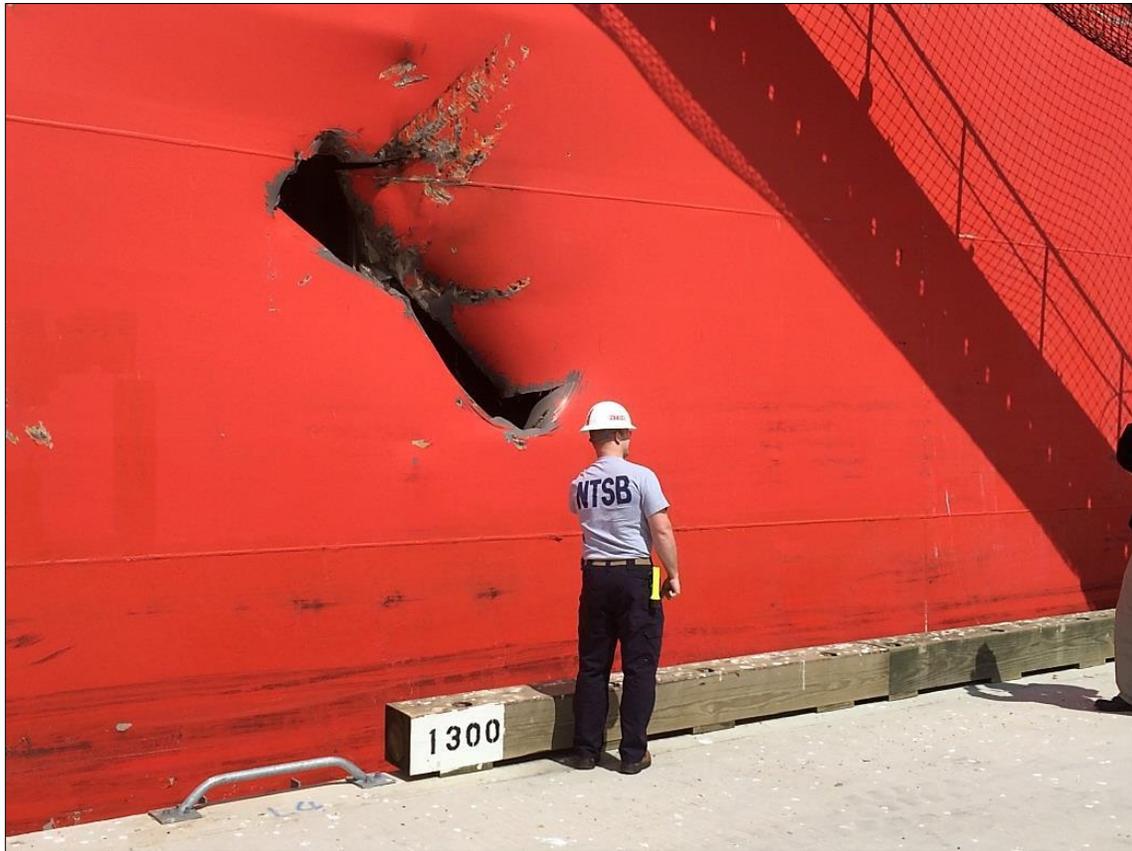
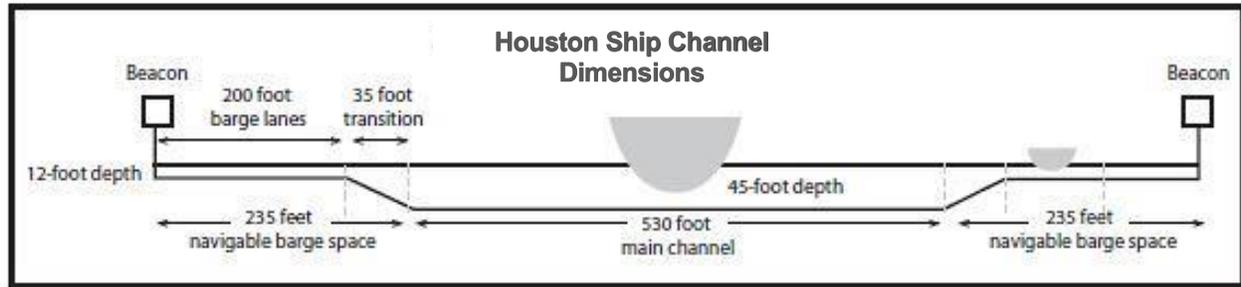


Photo showing the first point of contact on the *Monte Alegre*, where the starboard-side anchor of the *Chembulk Houston* punctured the hull.

Ships maneuvering in confined and shallow waters, such as those of the Houston Ship Channel, are subjected to many hydrodynamic forces for which pilots and ship crews must account. For example, a vessel transiting alone in the channel can experience an asymmetrical flow of water around its hull due to pressure variations between the port and starboard sides (stemming from factors such as channel contour, hull design, beam, draft, underkeel clearance, speed, wind speed, and proximity to the nearest bank). Essentially, the side of the hull closest to the bank is pulled toward that bank, and the bow of the vessel is pushed toward the center of the channel. This hydrodynamic phenomenon is called bank effect. In addition, close proximity of the vessel's hull to the bottom of the channel increases the resistance of water flow underneath the vessel, which in turn creates a low pressure area. As a result, the vessel rides lower in the water, and its trim fore or aft can change. This hydrodynamic phenomenon is called squat, or squat effect.

Two vessels transiting in close proximity to each other in the channel can create even more intense hydrodynamic forces, acting on one or both of the vessels. Overtaking maneuvers, such as the one attempted by the deputy pilot on the *Chembulk Houston*, are inherently higher risk than vessel-meeting situations because of the longer length of time during which the hydrodynamic forces can affect each vessel. (The NTSB performed motion and kinematics parameter extraction studies, using VDR and other data from both vessels, to determine the forces acting on each vessel during the overtaking attempt. Both studies are available in the public docket for this accident.)

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**Cross-sectional view of the Houston Ship Channel in the accident area. (Image provided by the Houston Pilots Association)**

The inland navigation rules (33 *United States Code* 2001), also referred to as the collision regulations (COLREGS), apply to all vessels upon the inland waters of the United States. The navigation rules provide all mariners with well-established regulations outlining specific actions to be taken to prevent collision in many, if not all, potential situations that may develop on those waterways. Overtakings are common in the Houston Ship Channel, and the navigation rules outline expectations to safely execute this maneuver.

Although the navigation crew and pilot on each vessel shared the responsibility to prevent an accident, the *Chembulk Houston*, as the give-way vessel, had the ultimate responsibility to avoid a collision and to keep well clear of the *Monte Alegre*. In turn, *Monte Alegre*, as the stand-on vessel, was required to maintain its course and speed, unless it became necessary to alter either one, or both, to avoid collision. The pilot's order to increase the *Monte Alegre's* speed—without informing the overtaking vessel—departed from expectations for the stand-on vessel to maintain its speed. That order resulted not only in a 2-knot speed increase of the *Monte Alegre*, but it also reduced the relative speed differential between the two vessels. This, in turn, increased the time and distance needed for the overtaking to be completed, which allowed the hydrodynamic forces acting on both vessels to build. Further, the increased hydrodynamic forces ultimately prevented the *Chembulk Houston* from developing enough speed to push through the bow pressure wave (generated on both sides of a vessel's bow as it moves forward through the water) of the *Monte Alegre*. Still, even after the deputy pilot on the *Chembulk Houston* expressed difficulty with overtaking the container ship, the pilot on the *Monte Alegre* said nothing about having increased his vessel's speed.

If the pilot on the *Monte Alegre* had informed the deputy pilot of the container ship's speed increase, the deputy pilot on the *Chembulk Houston* would have realized that he could not safely complete the final phase of the overtaking. By not providing this essential information, the pilot on the *Monte Alegre* contributed significantly to the deputy pilot's decision that the best course of action was to abort the overtaking. Had the information about the speed increase been provided in a timely manner, the deputy pilot would likely have chosen a different course of action. The communication from the pilot on the *Monte Alegre* to the deputy pilot on the *Chembulk Houston* was less than optimal.

It is difficult to predict exactly when ship-to-ship hydrodynamics interactions may begin impacting each vessel, or the exact level of influence those forces may have in each case. However, it is not unreasonable to expect that experienced Houston pilots should be aware of these risks and to work as a team, taking prudent corrective measures to counter the hydrodynamic effects. In this case, both of the Houston pilots failed to adequately execute their respective responsibilities during the overtaking attempt.

## Collision between Tanker *Chembulk Houston* and Container Ship *Monte Alegre*

### Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision between the *Chembulk Houston* and the *Monte Alegre* was the pilot's decision to increase speed on the *Monte Alegre* without informing the deputy pilot on the overtaking *Chembulk Houston*.

## Collision between Tanker *Chembulk Houston* and Container Ship *Monte Alegre*

### Vessel Particulars

Vessel	<i>Monte Alegre</i>	<i>Chembulk Houston</i>
Owner/operator	Containerschiffsreederei MS Monte Alegre GmbH & Co	Chembulk Houston Pte, Ltd
Port of registry	Hamburg, Germany	Singapore
Flag	Germany	Singapore
Type	Container ship	Tanker
Year built	2008	2003
Official number (US)	22059	393779
IMO number	9348065	9285469
Construction	Steel	Steel
Length	892.4 ft (272 m)	444.5 ft (135.5 m)
Draft	36 ft (10.9 m)	23 ft (6.9 m)
Beam/width	131.2 ft (40 m)	73.8 ft (22.5 m)
Gross and/or ITC tonnage	69,132 gross tons	9,230 gross tons
Engine power; manufacturer	61,365 hp (45,760 kW) Sulzer 8RTA96C 1 fixed-pitch propeller	6,559 hp (4,891 kW) MAN B&W 7S35MC 1 fixed-pitch propeller
Persons on board	24 crewmembers, 1 Houston pilot	22 crewmembers, 1 Houston deputy pilot, 1 passenger

For more details about this accident, visit [www.nts.gov](http://www.nts.gov) and search for NTSB accident ID DCA15FM016.

**Adopted: February 23, 2016**

**NTSB investigators worked closely with our counterparts from Coast Guard Sector Houston/Galveston and Marine Safety Unit Texas City throughout this investigation.**

The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under Title 49 *United States Code*, 1131. This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard from its informal investigation of the accident.

The NTSB does not assign fault or blame for a marine casualty; rather, as specified by NTSB regulation, “[NTSB] investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person.” Title 49 *Code of Federal Regulations*, 831.4.

Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by conducting investigations and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. Title 49 *United States Code*, 1154(b).